MODEL 17905

CHASSIS L1000S
RUN NO. 1
BOOK NO. 94X923.....352

television

SERVICE MANUAL

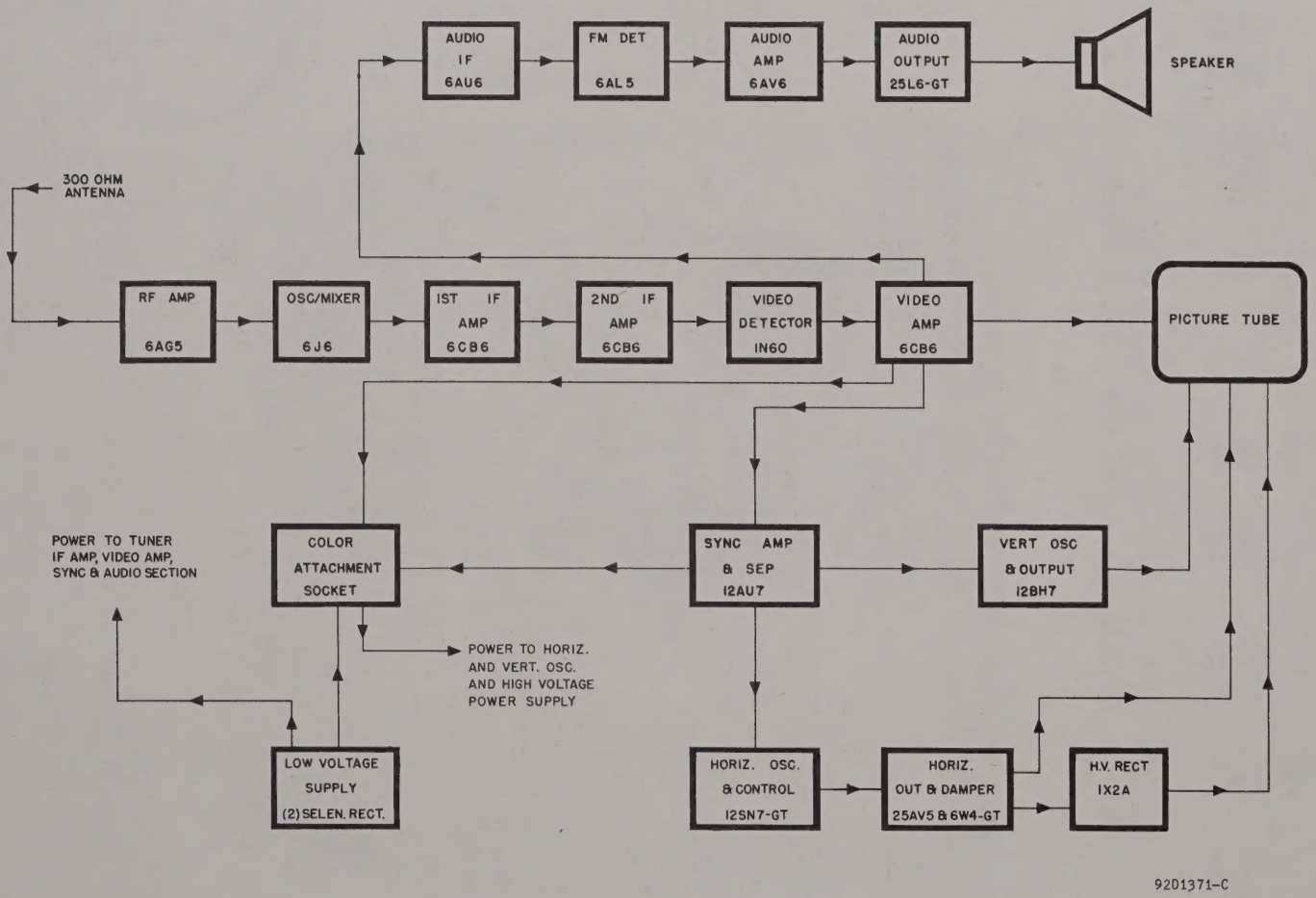
92X1507

1951
SERIES

MODEL 17905—LEATHERETTE COVERED TABLE MODEL

the hallicrafters co.

MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT, CHICAGO 24, U. S. A.



NOTE: FOR ALTERNATE TUBE TYPES REFER TO THE TUBE COMPLEMENT ON PAGE THREE

Fig. 1. Functional Block Diagram

GENERAL SPECIFICATIONS

ANTENNA	EXTERNAL OR BUILT-IN SILVER VORTEX
ANTENNA INPUT IMPEDANCE	300 OHMS
INTERCARRIER SOUND SYSTEM	4.5. MC
PICTURE TUBE SIZE	16" RECTANGULAR
POWER SUPPLY	110-120 V., 60 CYCLES
POWER INPUT	150 WATTS
PICTURE CARRIER IF	26.25 MC
SOUND CARRIER IF	21.75 MC
SPEAKER	5 INCH PM
TUNING	12 CHANNELS, 2-13
TUBES	17 INCLUDING 1 RECTIFIER PLUS 2 SELENIUM RECTIFIERS & 1 GERMANIUM DIODE

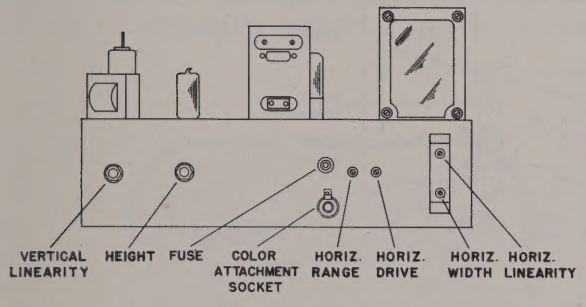


Fig. 2. Rear Chassis View

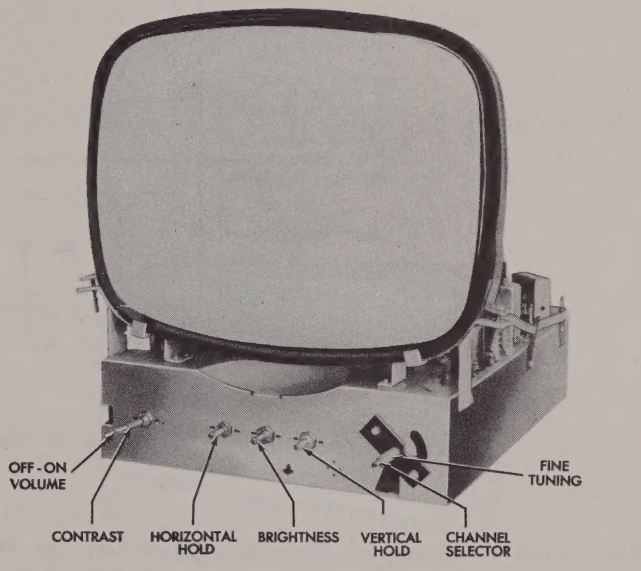


Fig. 3. Front Controls

HIGH VOLTAGE WARNING

OPERATION OF THE RECEIVER CHASSIS OUTSIDE OF THE CABINET INVOLVES DANGER OF ELECTRICAL SHOCK. EXERCISE ALL NORMAL HIGH VOLTAGE PRECAUTIONS WHEN WORKING WITH THIS RECEIVER.

TUBE COMPLEMENT

V-1	6CB6 or 6BC5 or 6AG5	RF AMPLIFIER
V-2	6J6	OSC/MIXER
V-101	6CB6	1ST IF AMPLIFIER
V-102	6CB6	2ND IF AMPLIFIER
V-103	6CB6	VIDEO AMPLIFIER
V-104	12AU7	SYNC. AMP. & SEP.
V-105	12BH7 (12SN7GT)	VERT. OSC. & OUT.
V-106	6AU6	AUDIO IF AMP.
V-107	6AL5	AUDIO DETECTOR
V-108	6AV6 (6SQ7)	1ST AUDIO AMP.
V-109	25L6GT	AUDIO OUTPUT
V-110	12SN7GT	HORIZ. OSC. & CONTROL
V-111	25AV5GT (25BQ6GT)	HORIZ. OUTPUT AMP.
V-112	1X2A	H. V. RECTIFIER
V-113	6W4GT	DAMPER
V-114	16RP4 or 16TP4 or 16UP4	16" RECTANGULAR BLACK PICTURE TUBE

Tubes shown in parentheses in the above list are alternate types which are not directly interchangeable. When replacing tubes use the same types found in the receiver chassis.

SERVICE ADJUSTMENTS

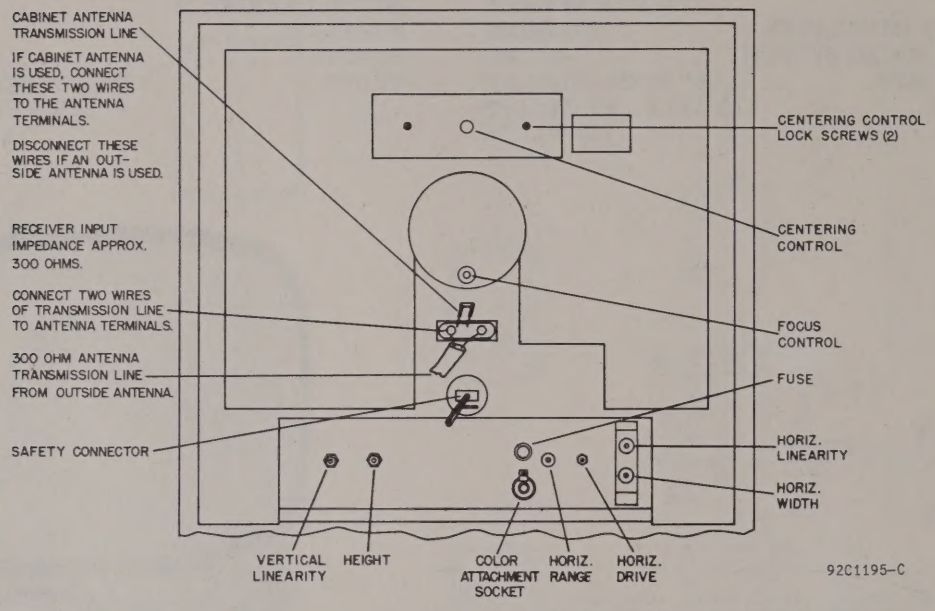


Fig. 4. Rear Cabinet View

With all other controls set for a normal picture the FOCUS CONTROL should be adjusted until the horizontal lines which make up the picture are as fine and distinct as possible. Use the lines in the center portion of the picture for this adjustment.

The following service adjustments will require only occasional minor adjustment as tubes age or are replaced. Any circuit changes or repairs will probably necessitate resetting the service adjustments. A test pattern, generated either locally in the shop or obtained from a television station, is recommended for best results. The operating and auxiliary controls, located on the front panel, should be set for as good a pattern as possible before making any of the following adjustments.

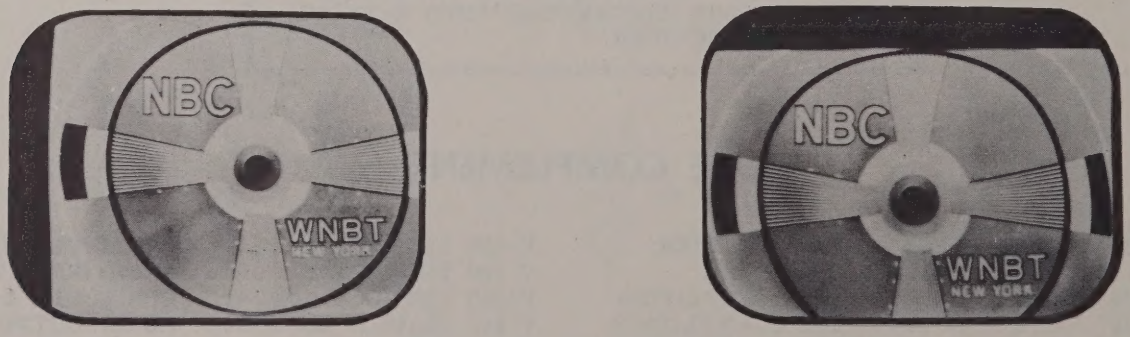


Fig. 5. Improper Centering Control Adjustment

If the picture is not properly centered remove the CENTERING CONTROL LOCK SCREW(S) and move the CENTERING CONTROL lever a short distance in any direction required to center the picture. Do not use force in making this adjustment as excessive strain may be exerted on the neck of the picture tube causing it to implode with dangerous and destructive violence. If proper centering cannot be restored in this manner a slight readjustment of the deflection yoke mounting may be necessary.

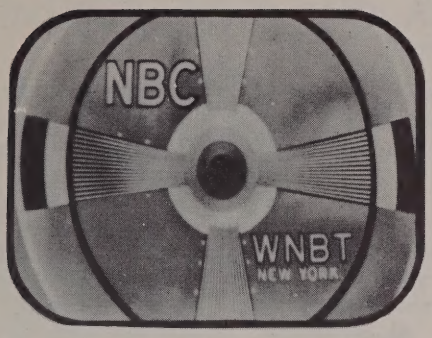


Fig. 6. Improper Height Control Adjustment

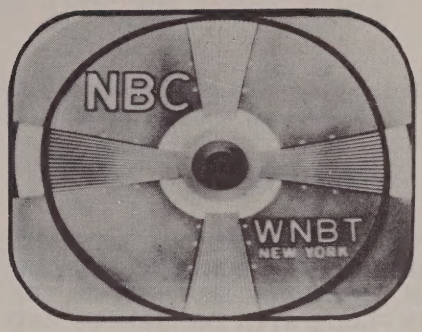


Fig. 7. Improper Width Control Adjustment

Adjust the HEIGHT and WIDTH controls so that the picture fills out the dimensions of the screen. A slight readjustment of the CENTERING CONTROL may then be necessary.

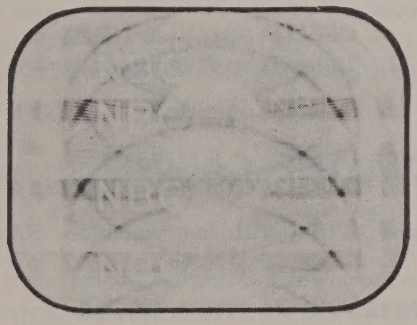


Fig. 8. Improper Vertical Hold Control Adjustment

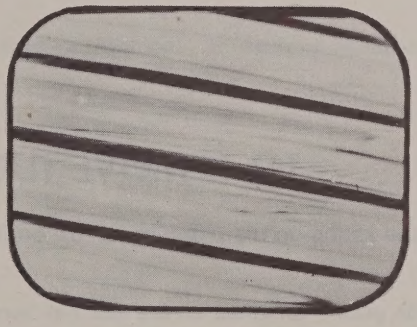


Fig. 9. Improper Horizonal Hold Control Adjustment

Adjust the VERTICAL and HORIZONTAL HOLD controls for a single steady picture. When the HORIZONTAL HOLD control is properly adjusted it should be possible to switch from one station to another with the picture remaining steady on any station.

Fig. 10. Improper Vertical Linearity Control Adjustment

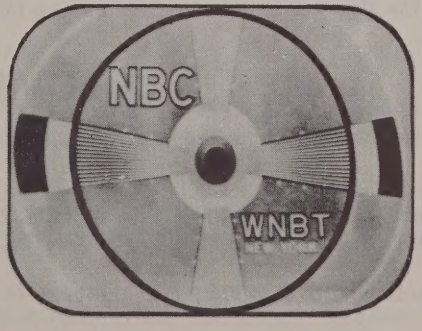


Fig. 11. Improper Horizontal Linearity Control Adjustment

Adjust the HORIZONTAL LINEARITY and VERTICAL LINEARITY controls for a symmetrical pattern. A slight readjustment of the HEIGHT and WIDTH controls may be necessary.

TEST PATTERNS COURTESY RCA SERVICE CO.

WARNING

THE PICTURE TUBE ENVELOPE ENCLOSES A HIGH VACUUM. ANY ACCIDENTAL BLOW OR ROUGH HANDLING MAY CAUSE THE TUBE TO IMPLODE WITH DANGEROUS AND DESTRUCTIVE VIOLENCE. THE PICTURE TUBE SHOULD BE HANDLED ONLY BY QUALIFIED PERSONS PROTECTED BY HEAVY GLOVES AND SHATTERPROOF GOGGLES.

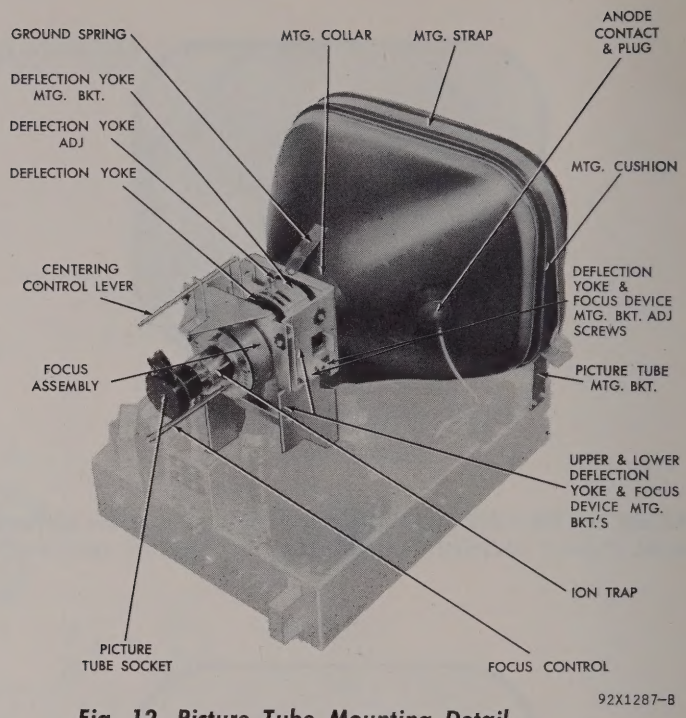


Fig. 12. Picture Tube Mounting Detail

TO REMOVE THE CHASSIS FROM THE CABINET

1. Remove the knobs on the front panel by pulling them straight forward in line with the shafts on which they are mounted.
2. Loosen the panel, mounted on the cabinet back, through which the CENTERING CONTROL LEVER protrudes by removing the CENTERING CONTROL LOCK SCREW(S).
3. Remove the screw located directly above the SAFETY CONNECTOR.
4. Disconnect the antenna leads from the antenna terminal strip.
5. Remove the cabinet back by unscrewing the wood screws holding it in place.
6. Remove the speaker plug at the chassis. On the table models, remove the speaker mounting nuts and lift out the speaker.
7. Remove the five chassis mounting screws on the bottom of the cabinet and slide the chassis from the cabinet.

REMOVING THE PICTURE TUBE

1. Remove the chassis from the cabinet by following the above procedure.
2. Disconnect the ANODE PLUG (PL-104) from the side of the tube. On chassis with a glass picture tube, discharge the aquadag coating by shorting the ANODE CONTACT to the outer coating of the tube. On chassis with a metal cone picture tube, short the ANODE CONTACT to chassis ground.
3. Disconnect the TUBE SOCKET at the base of the tube.
4. Slip the ION TRAP from the neck of the tube.
5. Remove the MOUNTING STRAP from the front rim of the tube.
6. Loosen the four REAR SUPPORT ADJUSTMENT SCREWS. Raise the front of the tube just far enough to clear the picture tube mounting brackets and slip the tube forward until the neck is clear of the DEFLECTION YOKE and FOCUS DEVICE assembly.

CAUTION: If the tube fails to slip out smoothly, investigate and remove the cause of trouble. DO NOT USE FORCE.

INSTALLATION AND ADJUSTMENT OF THE PICTURE TUBE

1. Place the RUBBER STRIP around the front rim of the tube. A large rubber band may be used to hold this strip in place. Position the tube so that the ANODE CONTACT is located at the left side of the tube when viewed from the front of the screen.

2. Slip the neck of the tube through the RUBBER COLLAR, DEFLECTION YOKE, and FOCUS DEVICE. Seat the RUBBER STRIP on the two front mounting brackets. Be sure that the face of the tube rests against the rubber stop pads and not against the mounting brackets.

3. Place the MOUNTING STRAP around the RUBBER STRIP and tighten the take-up screws on each end of the MOUNTING STRAP.

4. Move the REAR SUPPORT so that the RUBBER COLLAR rests firmly against and supports the cone of the tube. Tighten the REAR SUPPORT ADJUSTMENT SCREWS.

5. Check the ION TRAP for any markings and slip the trap over the neck of the tube. If the trap is stamped with an arrow, the arrow should point towards the face of the tube.

6. Connect the PICTURE TUBE SOCKET and the ANODE PLUG (PL-104).

7. Turn the receiver on and allow a few minutes for warm-up.

8. Turn up the BRIGHTNESS control and set the ION TRAP for maximum raster brilliance, backing off the BRIGHTNESS control as the maximum point is approached. The ION TRAP must be rotated about the axis of the tube as well as shifted along the neck to obtain the proper setting. With the BRIGHTNESS control set for slightly above normal brilliance and the CONTRAST control full counterclockwise, adjust the FOCUS control until the lines of the raster are clearly visible. Readjust the BRIGHTNESS control for normal brightness and touch up the ION TRAP setting.

9. Connect the antenna and tune in a test pattern.

10. Readjust the CONTRAST control until the different shades of the gray scale are clearly visible in the test pattern.

11. Check the position and appearance of the test pattern. If it is off center or shadowed at the corners (electron beam striking the neck of the tube) adjust the CENTERING LEVER. Adjust the FOCUS control (Fig. 4) until a clear sharp picture is obtained.

CAUTION - It will not be necessary to move the CENTERING LEVER excessively in any direction. Excessive force on the CENTERING LEVER may snap the neck of the picture tube.

12. If the lines of the raster are not horizontal or square with respect to the escutcheon, loosen the DEFLECTION YOKE ADJ. screw and rotate the DEFLECTION YOKE until the proper raster position is obtained. Tighten the screw after completing the adjustment.

13. Follow the procedure under "SERVICE ADJUSTMENTS" and make any minor adjustment of the FOCUS COIL or DEFLECTION YOKE necessary to obtain a properly adjusted picture.

PICTURE TUBE ANODE HIGH VOLTAGE MEASUREMENT

The second anode potential should be approximately 12,500 volts in a receiver that is functioning properly. If it is possible to obtain good picture brilliance the second anode potential is correct and need not be measured.

The setting of the HORIZONTAL DRIVE control will affect the high voltage on the second anode. Instructions for setting this control are given under the HORIZONTAL OSCILLATOR ADJUSTMENT instructions.

If it becomes necessary to measure the voltage present on the second anode a meter specifically designed for high voltage measurements should be used. The CONTRAST and BRIGHTNESS controls should be rotated to the extreme counterclockwise position and PL-104 should be connected to the picture tube. Under these conditions the test meter will load the high voltage power supply approximately the same amount as the picture tube does during normal operation.

CAUTION HIGH VOLTAGE

DO NOT USE HAND HELD FLEXIBLE TEST LEADS WHEN MAKING HIGH VOLTAGE MEASUREMENTS ON THE SECOND ANODE. AN 11 TO 14 KV. POTENTIAL EXISTS IN THIS CIRCUIT. ANY ACCIDENTAL CONTACT WITH SUCH A HIGH VOLTAGE CAN CAUSE A SEVERE BURN OR BE FATAL.

HORIZONTAL OSCILLATOR ADJUSTMENT

If the HORIZONTAL HOLD control on the front panel fails to restore synchronization the HORIZONTAL RANGE adjustment will have to be reset.

1. Position the HORIZONTAL HOLD control, located in the front of the receiver, in the center of the range over which it may be rotated.

2. Adjust the HORIZONTAL RANGE control, located in the rear apron of the chassis, until proper synchronization is obtained.

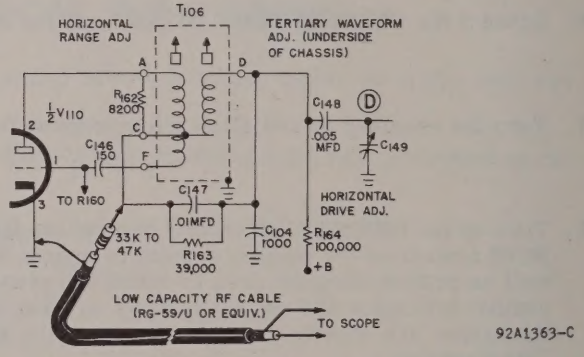


Fig. 13. Oscilloscope Connection for Horizontal Oscillator Adjustment

3. Test the synchronization on all active channels. The picture should remain in synchronization when switching from one active channel to another without any adjustment of the HORIZONTAL HOLD control or HORIZONTAL RANGE adjustment.

4. Repeat steps 1 and 2 if necessary.

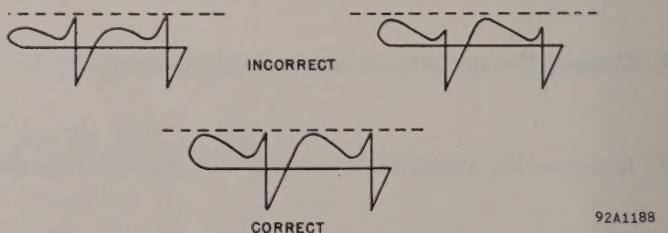


Fig. 14. Horizontal Oscillator Waveforms

If the above procedure fails to restore stable synchronization, a waveform adjustment may be made with the aid of an oscilloscope.

5. Connect a VTVM to test point Ⓓ and adjust the HORIZONTAL DRIVE padder for -22.5 to -25 volts as read by the VTVM. (Refer to schematic diag.)

6. Connect the oscilloscope as shown in Fig. 13. Adjust the TERTIARY WAVEFORM slug (located under chassis) until the sine wave is equal in amplitude to the peak of the sawtooth (See Fig. 14.), while maintaining the picture in synchronization with the HORIZONTAL RANGE adjustment.

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator becomes more serious.

On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the HORIZONTAL control approaches the extreme clockwise position.

7. Remove the oscilloscope and repeat step 5.

8. Repeat steps 1, 2, and 3 if necessary to provide positive synchronization on all active channels.

CHANNEL—CARRIER—OSC.—IF FREQUENCY CHART

Channel No.	Channel Freq. (mc)	Picture Carrier Freq. (mc)	Sound Carrier Freq. (mc)	Receiver Osc. Freq. (mc)	Picture IF Freq. (mc)	Sound IF Freq. (mc)	Picture IF less Sound IF (mc)
2	54-60	55.25	59.75	81.5	26.25	21.75	4.5
3	60-66	61.25	65.75	87.5	26.25	21.75	4.5
4	66-72	67.25	71.75	93.5	26.25	21.75	4.5
5	76-82	77.25	81.75	103.5	26.25	21.75	4.5
6	82-88	83.25	87.75	109.5	26.25	21.75	4.5
7	174-180	175.25	179.25	201.5	26.25	21.75	4.5
8	180-186	181.25	185.75	207.5	26.25	21.75	4.5
9	186-192	187.25	191.75	213.5	26.25	21.75	4.5
10	192-198	193.25	197.75	219.5	26.25	21.75	4.5
11	198-204	199.25	203.75	225.5	26.25	21.75	4.5
12	204-210	205.25	209.75	231.5	26.25	21.75	4.5
13	210-216	211.25	215.75	237.5	26.25	21.75	4.5

FM SOUND CHANNEL ALIGNMENT

A signal generator covering 4.5 MC and a vacuum tube voltmeter (VTVM) are required for this alignment.

1. Connect the output of the signal generator through a 0.005 mfd. capacitor between test point (A)* and chassis. See Fig. 15.

2. Connect the VTVM between test point (B) and chassis. See schematic diagram.

3. Set the signal generator to 4.5 MC and adjust the generator output level to give a 1 volt reading on the VTVM.

4. Adjust the 4.5 MC SOUND ADJUSTMENT and the primary of T-101 (bottom adjustment) for a maximum indication on the VTVM. Reduce the output of the generator as the alignment progresses to keep the VTVM reading at approximately 1 volt.

5. Connect the VTVM between test point (C) (see schematic diagram) and chassis. Adjust the secondary of T-101 (top adjustment) for a zero reading on the VTVM between a positive and negative peak. If the zero reading occurs at more than one setting, use the position nearest the top limit of the tuning slug.

6. Shift the signal generator frequency an equal amount on each side of 4.5 MC. and touch-up the primary of T-101 for approximately equal peaks.

I-F AMPLIFIER ALIGNMENT

A signal generator covering the frequencies listed in the chart below and a vacuum tube voltmeter (VTVM) are required for this alignment procedure.

1. Connect the VTVM between test point Ⓐ* and chassis. See Fig. 15.

2. Place a tight fitting shield over the OSC./MIXER tube (V-2) and connect the ungrounded or "HOT" lead of the signal generator to this shield. This shield should not be grounded. Connect the ground side of the signal generator to the frame of the tuning unit.

3. Turn the CHANNEL SELECTOR or CHANNEL TUNING control to any vacant channel.

4. Set the signal generator output (unmodulated) to develop approximately a 2 volt reading on the VTVM. Adjust the i-f amplifier coils at the frequencies given in the following chart. Adjust for a maximum VTVM reading and attenuate the generator output as required to maintain the 2 volt reading.

I-F AMPLIFIER ALIGNMENT CHART

Signal Generator Frequency (No Modulation)	Adjustment (Refer to Fig. 15)	
25.75 MC	L-9	(1st IF)
23.75 MC	T-103	(2nd IF)
24.75 MC	T-104	(Detector IF)

* Test point Ⓐ is located on top of the chassis as shown in Fig. 15.

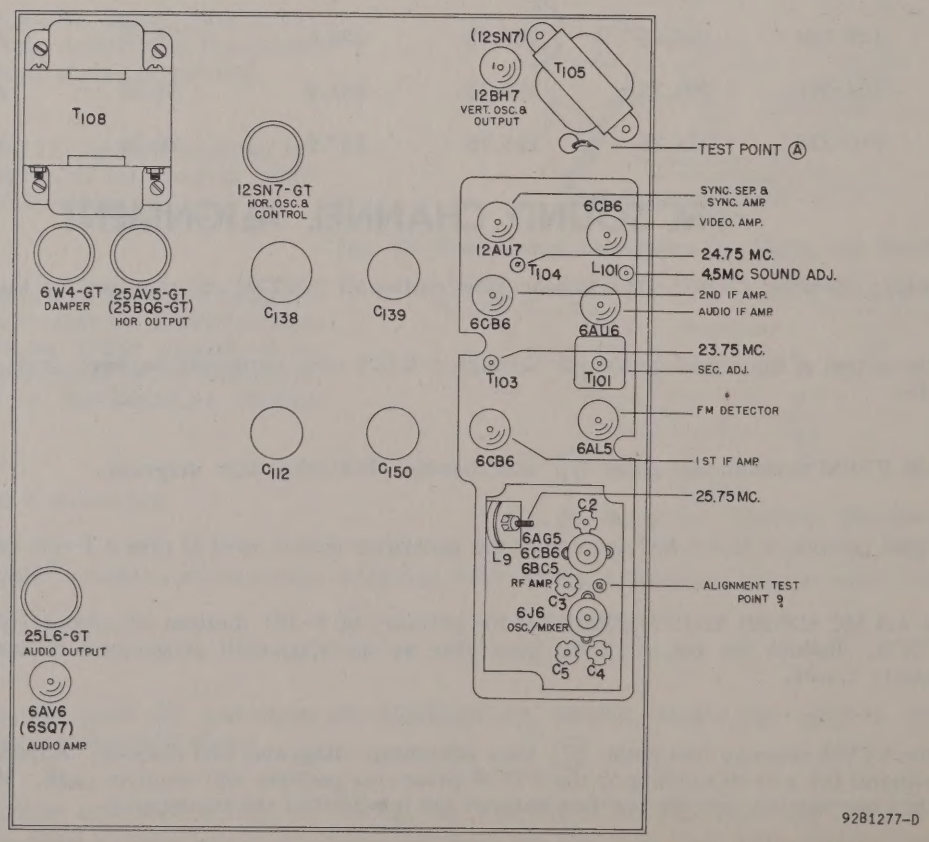


Fig. 15. Top View Alignment Locations

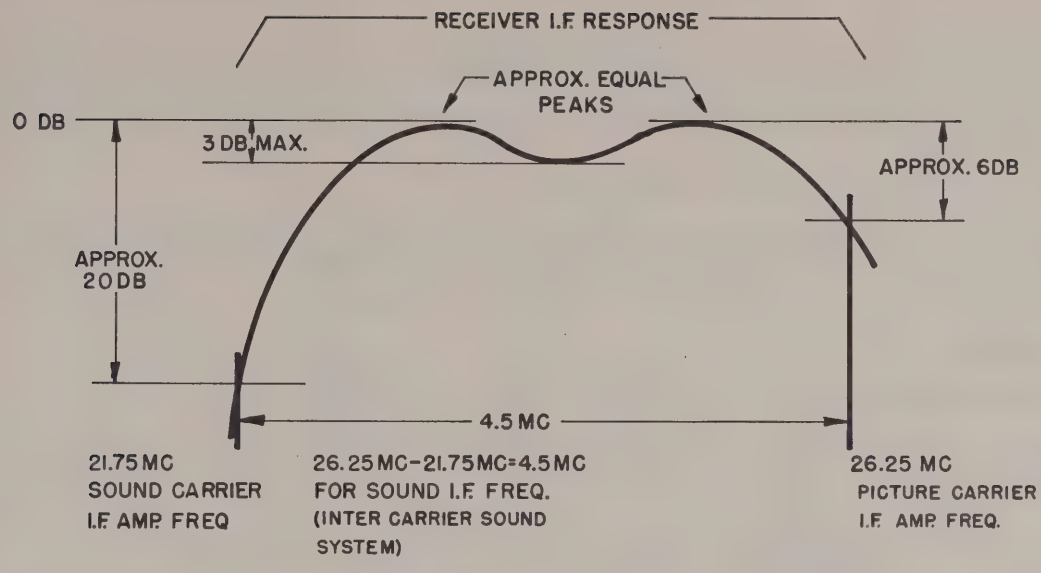


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Fig. 16. IF Amplifier Response

TWO TUBE 1D1049 TUNER ALIGNMENT

The 1D1049 tuner is carefully aligned at the factory and should not require complete realignment under normal conditions. A slight readjustment of the individual oscillator slugs may be required as the tubes in the tuner age or are replaced. In some rare cases it will be necessary to realign the tuner after replacing either of the two tubes. If any service work is performed on the tuner, realignment may or may not be required. NO ATTEMPT TO REALIGN THE TUNER SHOULD BE MADE UNTIL THE BALANCE OF THE TV RECEIVER IS KNOWN TO BE IN PROPER OPERATING CONDITION AND IS PROPERLY ALIGNED.

When replacing the R.F. amplifier tube use the same type tube as the one found in the tuner. The other alternate tubes may be used for V-1 but the use of a tube other than the type found in the tuner may make it necessary to realign the R.F. and mixer portion of the tuner.

EQUIPMENT REQUIRED

1. Sweep generator covering all 12 television channels
2. Marker generator covering the same range as the sweep generator
3. Signal generator which has an output (unmodulated) on 26.25 MC
4. Oscilloscope
5. Vacuum tube voltmeter (VTVM)

R-F AND MIXER ALIGNMENT

1. Set the CHANNEL SELECTOR switch to channel 12.
2. Connect the oscilloscope through a 10,000 ohm resistor to test point 9. See Fig. 15.
3. Connect the negative side of a 1.5 volt battery to the terminal where the AGC lead (white wire) from the tuner and one lead from R-117 are connected. Refer to schematic diag. Connect the positive side of the battery to the chassis.
4. Set the FINE TUNING control at the approximate midpoint of its tuning range.
5. Connect the sweep generator to the antenna terminals and adjust the output to sweep channel 12.
6. Loosely couple the output from the marker generator to the antenna terminals. Use the minimum amount of coupling and signal from the marker generator required to give a plainly visible marker or pip on the oscilloscope pattern.

7. Adjust C-2, C-3, and C-4 (Fig. 15) for maximum gain and a flat-top response curve approximately 4.5 MC wide. All other channels should be checked to be sure they have approximately the same response. The correct marker frequencies for each channel are given in the Picture Carrier and Sound Carrier columns of the chart on page 9.

8. Disconnect the battery used to obtain negative bias.

9. Disconnect the test equipment and check the receiver performance on all active channels. If it is possible to receive a normal picture on all active channels by adjusting the FINE TUNING control, further alignment will not be necessary.

OSCILLATOR ALIGNMENT

1. Set the FINE TUNING control at the approximate midpoint of its tuning range.

2. Place a non-metallic screwdriver through the openings provided in the front of the chassis and the tuner assembly and adjust the oscillator coil slug for each active channel to give the best possible picture.

If the oscillator slug adjustment does not have sufficient range to tune in a good picture on any active channel it will be necessary to adjust C-5. The procedure for this adjustment is as follows:

WITH INSTRUMENTS

3. Set the CHANNEL SELECTOR switch to channel 12.
4. Connect the marker generator to one antenna terminal and ground. Set generator to 209.75 MC.
5. Connect the output of another signal generator to point (A) through a 47,000 ohm resistor and adjust the generator frequency to 26.25 megacycles.
6. Connect the VTVM to point (C) (see schematic diag.) and adjust C-5 for a zero reading on the VTVM between a positive and negative peak.
7. Use only sufficient output from the signal generators to obtain a useable meter reading.
8. Repeat steps 1 and 2.
9. Repeat steps 3 through 8 if necessary.

WITHOUT INSTRUMENTS

3. Set the CHANNEL SELECTOR switch to any active channel on which a picture or test pattern can be received. Preferably select a station operating on the highest frequency or channel.
4. Adjust C-5 for the best possible picture.
5. Repeat steps 1 and 2
6. Repeat steps 3 through 5 if necessary.

SERVICE PARTS LIST FOR 1D1055 TUNER

Hallicrafters Part Number	Description	Hallicrafters Part Number	Description
121A001	Fine tuning assembly shaft & cam	121A020	Channel 7 r-f & osc. coil
121A002	Drum & shaft assembly, less coils	121A021	Channel 8 r-f & osc. coil
121A003	Channel 2, antenna coil	121A022	Channel 9 r-f & osc. coil
121A004	Channel 3 antenna coil	121A023	Channel 10 r-f & osc. coil
121A005	Channel 4 antenna coil	121A024	Channel 11 r-f & osc. coil
121A006	Channel 5 antenna coil	121A025	Channel 12 r-f & osc. coil
121A007	Channel 6 antenna coil	121A026	Channel 13 r-f & osc. coil
121A008	Channel 7 antenna coil	121A027	Detent roller
121A009	Channel 8 antenna coil	121A028	Fiber washer
121A010	Channel 9 antenna coil	121A029	Spring, fine tuning ground
121A011	Channel 10 antenna coil	121A030	Spring, shaft retaining (2 req.)
121A012	Channel 11 antenna coil	121A031	Spring, detent
121A013	Channel 12 antenna coil	121A032	L-9 peaking coil
121A014	Channel 13 antenna coil	121A033	Slug, osc. coil adjustment
121A015	Channel 2 r-f & osc. coil	121A034	Spring, osc. coil slug retaining
121A016	Channel 3 r-f & osc. coil	121A035	Stator contact assembly
121A017	Channel 4 r-f & osc. coil	121A036	Fine tuning capacitor plate
121A018	Channel 5 r-f & osc. coil	121A037	Spring, detent ground
121A019	Channel 6 r-f & osc. coil		

NOTE: The last two digits of the part numbers shown in the Service Parts List are used to identify the corresponding part in Fig. 17.

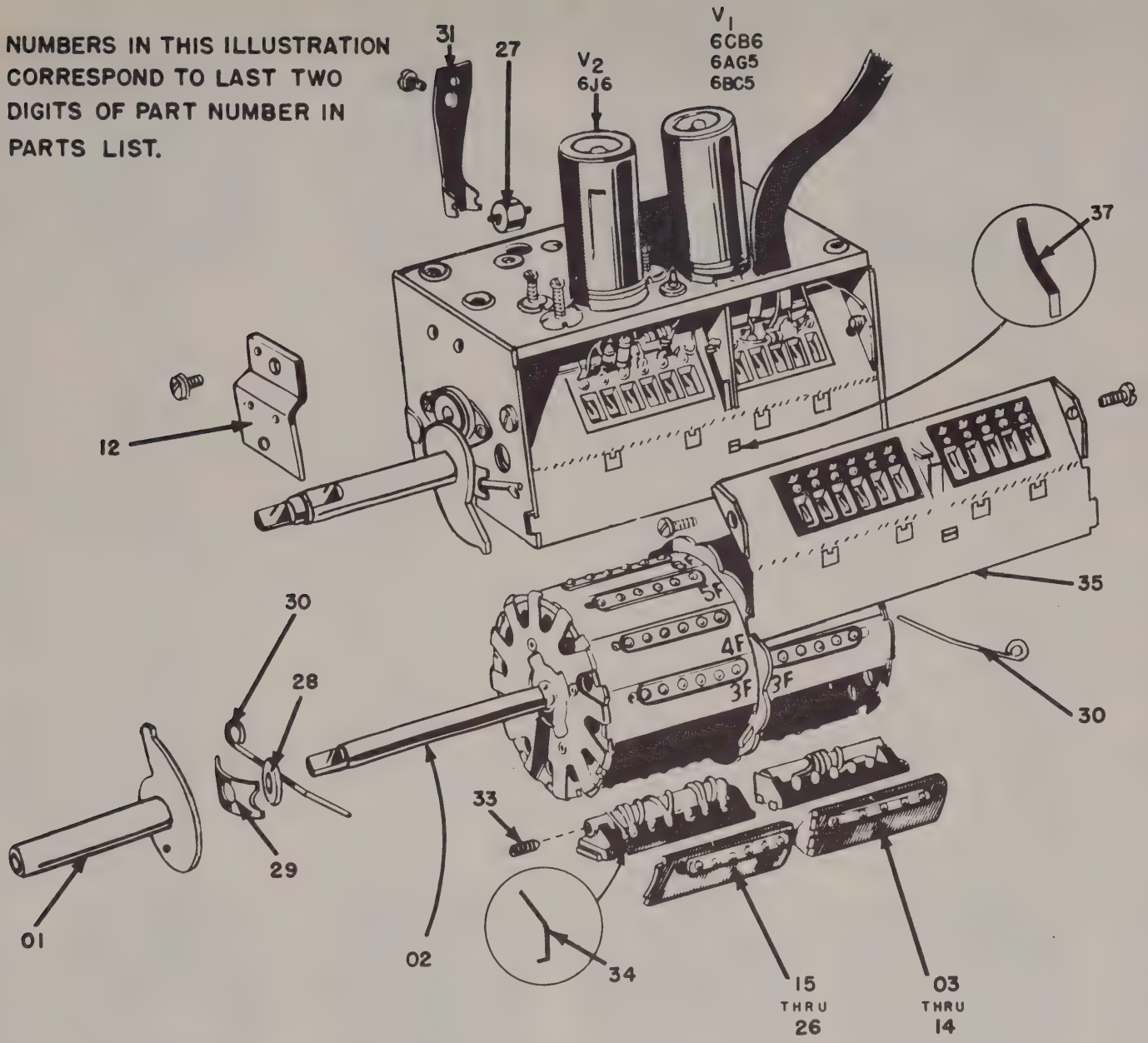


Fig. 17. Tuner Replaceable Parts I-F

TYPICAL OSCILLOSCOPE PATTERNS

The patterns given on the following pages are presented as a guide when using an oscilloscope to locate trouble in the video amplifier, sync., horizontal oscillator, horizontal output, vertical oscillator, and vertical output stages of the TV receiver.

Considerable variation may be noted in the amplitude and shape of some of the waveforms when comparisons are made between receivers. As long as the waveform obtained from the receiver under test contains the same general characteristics as those shown in the illustrations and the relative amplitude is within approximately 25% of the peak to peak voltage or relative amplitude shown below each waveform, the pattern obtained may be assumed to be correct. The patterns are observed with the TV receiver tuned to an active channel and the controls adjusted for the best possible picture.

The waveforms shown in the illustrations were obtained on a Dumont type 304 oscilloscope which was used in conjunction with a low capacity 10 to 1 probe such as the Tel-Instrument Co. type 1610. Other types of oscilloscopes will account for a certain amount of variation in the amplitude and shape of the patterns obtained from the actual receiver under test. A low capacity probe must be used in order to obtain satisfactory results.

All patterns are taken with the ground side of the oscilloscope connected to the chassis of the TV receiver and the 10 to 1 probe connected to the specific points in the TV chassis as specified by each pattern.

The patterns obtained from the horizontal amplifier plate, damper cathode, horizontal output transformer, and the high voltage rectifier tube must be observed by means of the shielded high voltage probe shown in Fig. 18. The 1X2A tube is used only as a high voltage coupling capacitor. However, the tube must be in good condition as any piece of metal such as a broken filament could cause an internal short and damage the 10 to 1 probe or the oscilloscope. A tube with low emission can be used. The patterns are also shown with their relative amplitudes indicated with respect to the pattern obtained at the plate (pin 5) of the damper tube V-113 which is given a unit value of one.

The shield shown in the special high voltage probe in Fig. 18 is required to prevent spurious pick-up from the field surrounding the horizontal output transformer.

At certain points throughout the TV receiver the oscilloscope pattern obtained will be dependent upon the frequency of the horizontal sweep oscillator in the oscilloscope. The oscilloscope sweep frequency must be either 30 cps ($\frac{1}{2}$ of the TV vertical oscillator frequency) or 7875 cps ($\frac{1}{2}$ of the TV horizontal oscillator frequency) depending upon the pattern desired. The sweep frequency required to obtain the patterns shown is given with each pattern.

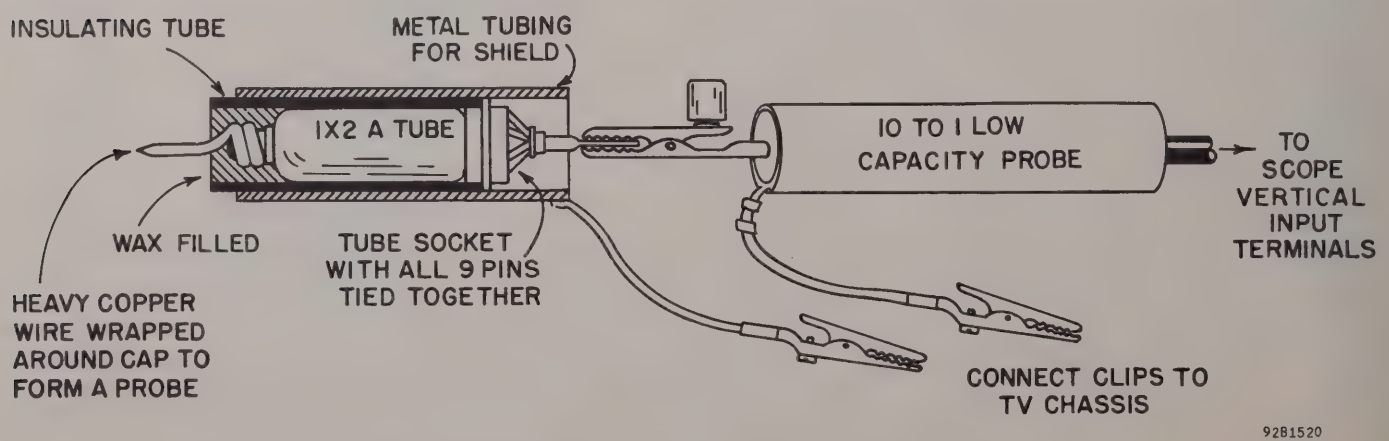


Fig. 18. High Voltage Probe for Waveform Observations

92C1517
1

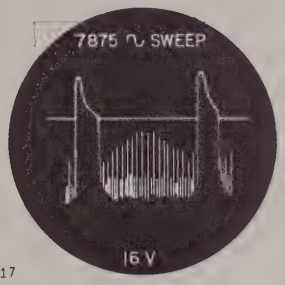
Junction of L-105, L-106 & C-114 or V-103 Video Amp. Plate (Pin 5) or Picture Tube Cathode (Pin 11)

Set the contrast control to give a 40 volt peak to peak reading. Leave the control at this setting when viewing the balance of the waveforms.

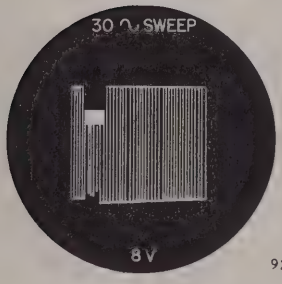
92C1517
6

92C1517
2

V-104 Sync. Amp. Grid (Pin 2)



92C1517
7



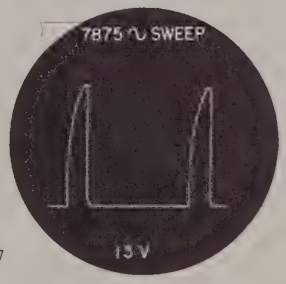
92C1517
3

V-104 Sync. Amp. Plate (Pin 1)
or
V-104 Sync. Sep. Grid (Pin 7)

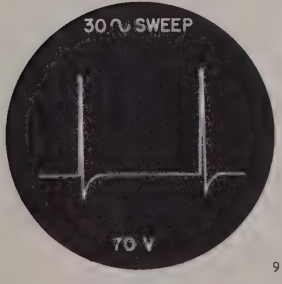
92C1517
8

92C1517
4

V-104 Sync. Sep. Plate (Pin 6)



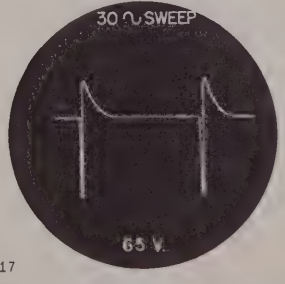
92C1517
9



92C1517
10

Vertical Integrating Network CRL-101 (Terminal 2)

V-114 Picture Tube Grid (Pin 2)

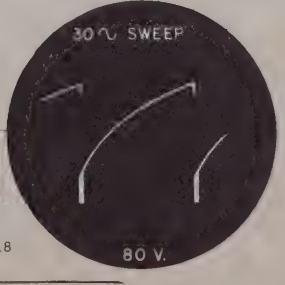


92C1517
5

92C1518
6

V-105 Vert. Osc. Grid (Pin 2)

V-105 Vert. Osc. Plate (Pin 1)



92C1518
1

92C1518
7

V-105 Vert. Amp.
Grid (Pin 7)

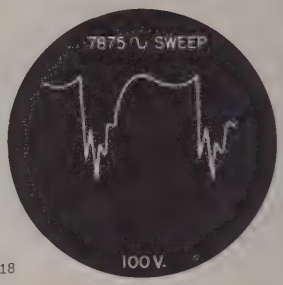
V-105 Vert. Amp.
Plate (Pin 6)

92C1518
2

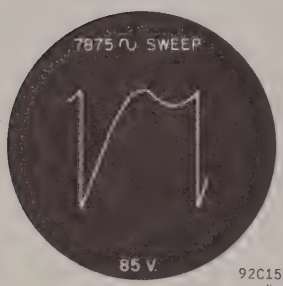
92C1518
3

V-110 Horiz. Osc.
Plate (Pin 5)

V-110 Horiz. Osc.
Plate (Pin 2)



92C1518
8

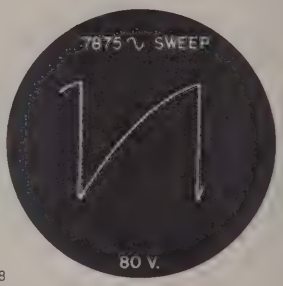


92C1518
4

T-106 Horiz. Osc.
Transformer.
Terminal "C"

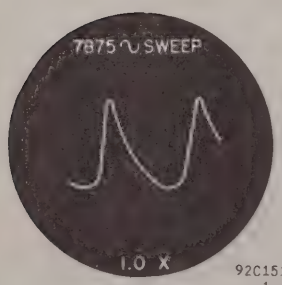
Horiz. Osc. Transformer
Terminal "D"

V-111 Horiz. Out. Amp.
Grid (Pin 1)



92C1518
9

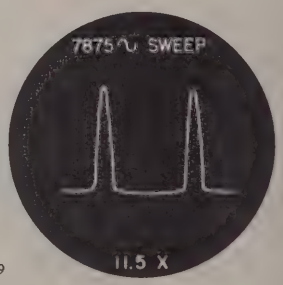
NOTE: Before endeavoring to view the following waveforms read the notes and and instructions at the beginning of this section pertaining to waveform analysis. The high voltage probe shown in Fig. 18 must be used.



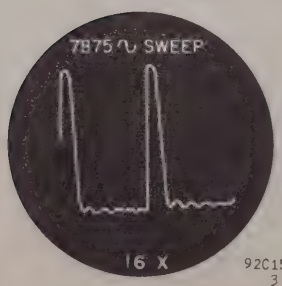
92C1519
1

V-113 Damper
Plate (Pin 5)

V-113 Damper
Cathode (Pin 3)



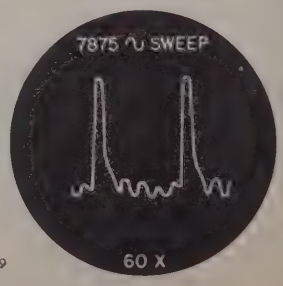
92C1519
2



92C1519
3

Horiz. Output
Amp. Plate (Pin 5)

High Voltage Rectifier
Plate (Cap)



92C1519
4

SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number
	COILS AND TRANSFORMERS	
T-101	Transformer, ratio detector	50B473
T-102	Transformer, audio output	55A157
T-103	Transformer, 2nd i-f amplifier	51A1288
T-104	Transformer, 3rd i-f amplifier	51A1289
T-105	Transformer, vertical output	55A166 or 55B128
T-106	Transformer, horizontal oscillator	51B1242
T-107	Transformer, horizontal output for 25AV5GT	55C156
	for 25BQ6GT	55C171
T-108	Transformer, power	52C212
L-101	Coil, 4.5 MC SOUND ADJ.; peaking coil	50B474
L-102	Deflection yoke	53C212
L-103	Coil, video peaking (wound on R-127)	51A1257
L-104	Coil, video peaking	51A1286
L-105	Coil, video peaking (wound on R-133)	51A1285
L-106	Coil, video peaking	51A1284
L-107,112	Choke, filter	56B116
L-108	Coil, WIDTH control	51B1438
L-109	Coil, HORIZONTAL LINEARITY	51B1335
L-110	Choke, r-f (wound on R-117)	53A219
	CAPACITORS	
C-101	2.2 mmf. 500 V., ceramic	47A160-4
C-102	47 mmf. 500 V., ceramic (part of L-101)	---
C-103A & B	Dual 4000 mmf., ceramic disc	47A218
C-104	1000 mmf. 10%, 500 V., mica	47X20B102K
C-105	100 mfd. 10 V., electrolytic	45B170 or 45B185
C-106	5 mfd. 50 V., electrolytic	45B175
C-107	330 mmf. 10%, 500 V., ceramic	47B20331K5
C-108,144,175	1000 mmf. 500 V., ceramic	47B20A102M5
C-109	.01 mfd. 200 V., tubular paper	46AU103J
C-113,131,157	.01 mfd. 600 V., tubular paper	46AY103J
C-111,170	220 mmf. 500 V., mica or ceramic	47X20B221K or 47B20A221K5
C-112	60 mfd. 150 V., electrolytic	45B180
C-114,116,127, 134,135,152, 158,160	.05 mfd. 600 V., tubular paper	46AY503J
C-115	56 mmf. 500 V., mica (part of L-102)	---
C-117	8 mfd. 350 V., electrolytic	45B184
C-118,119,120, 121,122,141	5000 mmf. ceramic disc	47A168
C-123	5 mmf. 500 V., ceramic	47B20050K5
C-124,125,172	.5 mfd. 25 V., tubular paper	46A177
C-126	390 mmf. 500 V., ceramic	47B20A391M5
*C-129	1000 mmf. 800 V., mica	47A227
C-132	100 mfd. 50 V., electrolytic	45A105
*C-136,137	.01 mfd. 600 V., molded tubular	46BR103L6
C-138A,B, & C	Triple 60 mfd. 300 V., electrolytic	45B179
C-139,166	80 mfd. 150 V., electrolytic	45B187
C-142	.5 mfd. 200 V., tubular paper	46AT504J
C-143,148	.005 mfd. 600 V., tubular paper	46AY502J
C-145	.05 mfd. 200 V., tubular paper	46AU503J
C-146	150 mmf. 500 V., mica	47X20B151K
*C-147	.01 mfd. 400 V., molded tubular or ceramic 46BR103E4 or	47A224

Schematic Symbol	Description	Hallicrafters Part Number
	CAPACITORS (Cont.)	
C-149	Trimmer, HORIZONTAL DRIVER control	44A361
C-150	Dual 10 mfd. 450 V.; electrolytic (only 1 section used)	45B182
C-151	.25 mfd. 200 V., tubular paper	46AT254J
C-153	.1 mfd. 600 V., tubular paper	46AY104J
C-154,156	.02 mfd. 600 V., tubular paper	46AY203J
C-155	.035 mfd. 600 V., tubular paper	46AY353J
C-163	1000 mmf. 500 V., ceramic	47B20A102N5
C-164,165	.005 mfd. 10%, 600 V., tubular paper	46AY502E
C-171	100 mmf. 500 V., mica or ceramic	47X20B101M or 47B20A101M5
C-174	.005 mfd. 400 V., tubular paper	46AW502J
C-176	.1 mfd. 200 V., tubular paper	46AU104J
C-177	8 mfd. 475 V., electrolytic	45A103
C-178	.002 mfd. 600 V., tubular paper	46AZ202E
	RESISTORS	
R-101,124	150 ohms 1/2 watt, carbon	23X20X151K
R-102	270 ohms 1/2 watt, carbon	23X20X271K
*R-103,104	10,000 ohms 1/2 watt, carbon	23X20X103J
R-105,137	33,000 ohms 1/2 watt, carbon	23X20X333K
R-106,126,139, 152,162	8200 ohms 1/2 watt, carbon	23X20X822K
R-107,132	1 megohm/2500 ohms, OFF-ON-VOLUME/CONTRAST control	25B902
R-108	6.8 megohms 1/2 watt, carbon	23X20X685M
R-109	390,000 ohms 1/2 watt, carbon	23X20X394K
*R-110	390,000 ohms 1/2 watt, carbon	23X20X394J
*R-111	270,000 ohms 1/2 watt, carbon	23X20X274J
R-112,195	150,000 ohms 1/2 watt, carbon	23X20X154K
R-114	47,000 ohms 1/2 watt, carbon	23X20X473M
R-115,116,150	560 ohms 1/2 watt, carbon	23X20X561K
R-117	82,000 ohms 1/2 watt, carbon (part of L-110)	---
R-118	47 ohms 1/2 watt, carbon	23X20X470K
R-119,120,123	100 ohms 1/2 watt, carbon	23X20X101K
R-122,165,189	10,000 ohms 1/2 watt, carbon	23X20X103K
R-125	150 ohms 1/2 watt, carbon	23X20X151M
R-127	15,000 ohms 1/2 watt, carbon (part of L-103)	---
R-128	39,000 ohms 1/2 watt, carbon	23X20X393M
R-129,147,190	220,000 ohms 1/2 watt, carbon	23X20X224K
R-130,142	1 megohm 1/2 watt, carbon	23X20X105M
R-131	15 ohms 1 watt, carbon	23X30X150M
R-133	33,000 ohms 1/2 watt, carbon (part of L-105)	---
R-134	2200 ohms 1 watt, carbon	23X30X222M
R-135,136	3300 ohms 1 watt, carbon	23X30X332K
R-138	330,000 ohms 1/2 watt, carbon	23X20X334K
R-143	2.5 megohms: HEIGHT control	25B711
R-144,151,191	2.2 megohms 1/2 watt, carbon	23X20X225M
R-145	1 megohm: VERTICAL HOLD control	25A900
R-148,196,197	47,000 ohms 1/2 watt, carbon	23X20X473K
R-149	2500 ohms: VERTICAL LINEARITY control	25B899
R-153	20 ohms 10 watts, WW	24A927
R-155,163	39,000 ohms 1/2 watt, carbon	23X20X393K
R-156,173	100,000 ohms 1/2 watt, carbon	23X20X104K
R-157	8200 ohms 1/2 watt, carbon	23X20X822M
R-160	82,000 ohms 1 watt, carbon	23X30X823K
R-161	50,000 ohms; HORIZONTAL HOLD control	25A901

* USE EXACT REPLACEMENT PARTS ONLY.

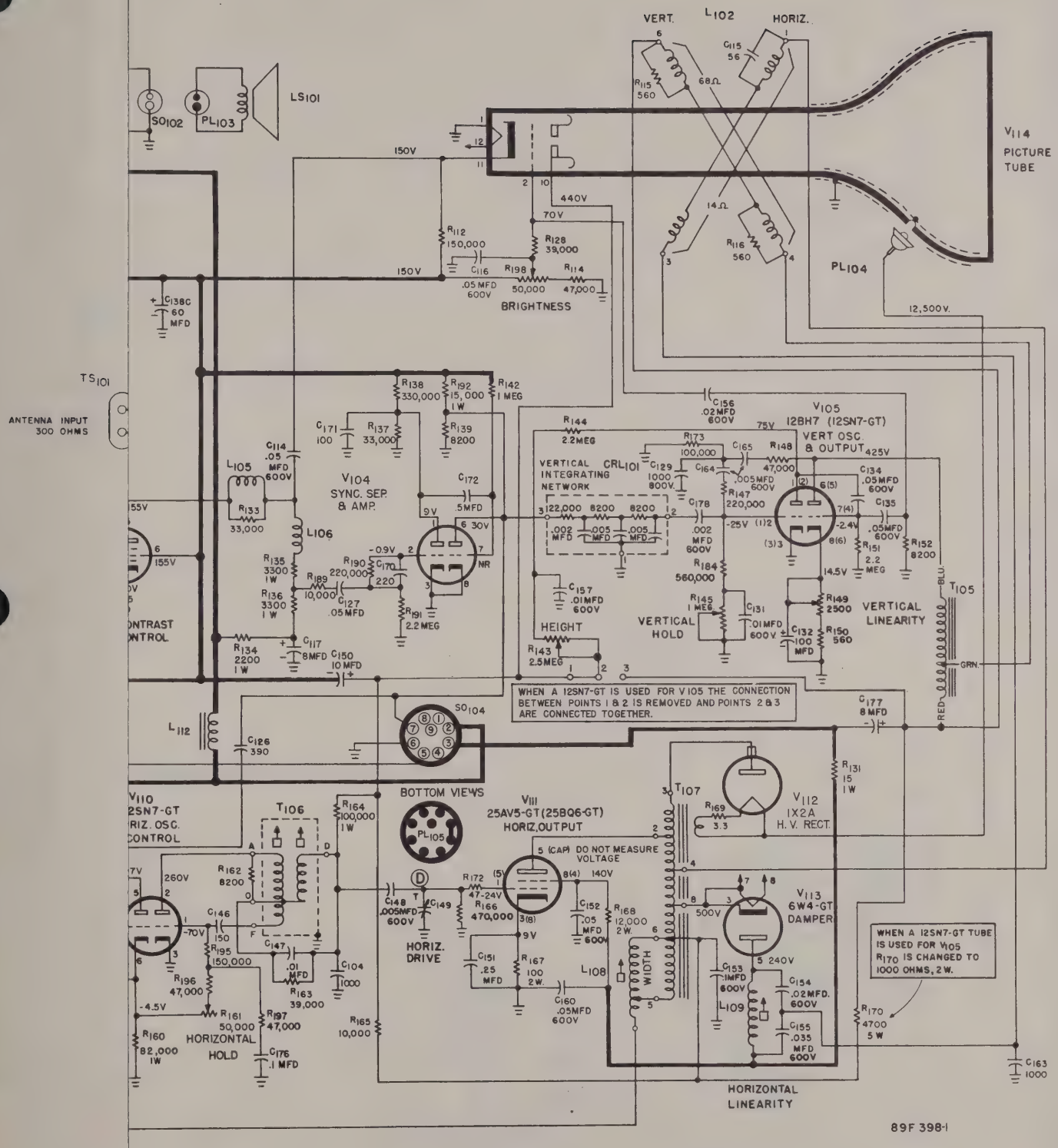
SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number
	RESISTORS (Cont.)	
R-164	100,000 ohms 1 watt, carbon	23X30X104K
R-166	470,000 ohms 1/2 watt, carbon	23X20X474M
R-167	100 ohms 2 watts, carbon	23X40X101K
R-168	12,000 ohms 2 watts, carbon	23X40X123K
R-169	3.3 ohms 1/2 watt, carbon	23X20X033K
R-170	4700 ohms 5 watts, WW or 1000 ohms 2 watts, carbon (See schematic notes)	24BF472E 23X40X102K
R-172	47 ohms 1/2 watt, carbon	23X20X470M
R-184	560,000 ohms 1/2 watt, carbon	23X20X564K
R-192	15,000 ohms 1 watt carbon	23X30X153K
R-193,194	12,000 ohms 1/2 watt, carbon	23X20X123K
R-198	50,000 ohms; BRIGHTNESS control	25A901
R-199	12,000 ohms 3 watts, WW	24A931
	TUBES AND RECTIFIERS	
V-1	6AG5, 6BC5 or 6CB6; r-f amplifier (part of TV tuner)	---
V-2	6J6: oscillator/mixer (part of TV tuner)	---
V-101,102,103	6CB6: 1st, and 2nd, i-f amp. and video amp.	90X6CB6
V-104	12AU7: sync. separator and amplifier	90X12AU7
V-105	12BH7: vert. osc. and output or 12SN7GT: vert. osc. and output	90X12BH7 90X12SN7GT
V-106	6AU6: audio i-f amp.	90X6AU6
V-107	6AL5: FM detector	90X6AL5
V-108	6AV6: audio amplifier or 6SQ7: audio amplifier	90X6AV6 90X6SQ7
V-109	25L6GT: audio output	90X25L6GT
V-110	12SN7GT: hor. osc. and control	90X12SN7GT
V-111	25AV5GT: horizontal output or 25BQ6GT: horizontal output	90X25AV5GT 90X25BQ6GT
V-112	1X2A: high voltage rectifier	90X1X2A
V-113	6W4GT: damper	90X6W4GT
V-114	16RP4: picture tube	90X16RP4
X-101	1N60 crystal diode	19B1246
X-102,103	Selenium rectifier, 300 ma.	27A155
	MISCELLANEOUS PARTS	
	Bearing, fiber; tuner shaft	8B1141
	Bracket, deflection yoke and focus assembly mtg. (bottom)	67D1235
	Bracket, deflection yoke and focus assembly mtg. (upper)	67D1348
	Bracket, deflection yoke mtg. (mounted on 67D1348)	67C1244
	Bracket, focus assembly support (mounted on 67D1348)	67C1386
	Bracket, focus device mounting (mounted on 67C1386)	63C503 or 63C489
	Bracket, pivot support (mounted on 67C1386)	67C1359
	Bracket, pivot; for centering control lever	67A1360 or 67B1351

Schematic Symbol	Description	Hallicrafters Part Number
	MISCELLANEOUS PARTS (Cont.)	
	Bracket, mounting for TS-101 and SO-101	67C1447
	Bracket, picture tube mtg.; front right	67C1313
	Bracket, picture tube mtg.; front left	67C1312
	Collar, picture tube mtg. (mounted in front of deflection yoke)	16C202
	Cushion, picture tube mtg.; sponge rubber	16A163
	Focus device assembly; PM	21C123 or 21C118
F-101	Fuse, 1/4 amp. 125 V.; slow blow	39A353
F-102	Fuse, 1.5 amp. 250 V.; pigtail leads	39A354
	Fuse holder for F-101	6A053
	Ion trap; 39 to 49 gauss	21A120
	Lever, centering control	74B337
PL-104	Plug, picture tube anode	10A377
PL-105	Plug, 9 pin; color adapter	10A299
SO-101	Socket, a-c power	10A286
SO-104	Socket, 9 pin; color adapter	6A370
	Socket, miniature 9 pin; molded mica filled	6A360
	Socket, miniature 9 pin; wafer	6A334
	Socket, miniature 7 pin; wafer	6A340
	Socket, 9 pin; wafer with corona ring	6A361
	Socket, octal; molded	6B296
	Socket, picture tube	6A386
SO-102	Socket, speaker	10A373
	Spring, picture tube ground	75B177
	Strap, picture tube mounting	76A628
S-101	Switch, OFF-ON (part of R-107)	
TS-101	Terminal strip, antenna	88A020 or 88A679
	Tuning unit assembly; complete with tubes	1D1049
CRL-101	Vertical integrating network	49B015
	CABINET PARTS	
	Antenna, Silver Vortex built-in	57D147
	Cabinet	78F667
	Cabinet back	8A1607
	Escutcheon assembly, front controls	7B274
	Escutcheon mask, picture tube	7D217
	Escutcheon, picture tube	7D196
	Glass, safety	22D292
	Knob, OFF/ON - VOLUME	15C297
	Knob, FINE TUNING	15A299
	Knob, CONTRAST	15D265
	Knob, CHANNEL SELECTOR	15D293
PL-101	Line cord and plugs	87A1668
PL-102	Plug, safety interlock connector (part of PL-101)	---
PL-103	Plug, speaker	10A372
LS-101	Speaker, 5 inch PM	85C103

* USE EXACT REPLACEMENT PARTS ONLY.

FOUND.
) TO THE



MODEL 17905

SCHEMATIC DIAGRAM

RUN 1

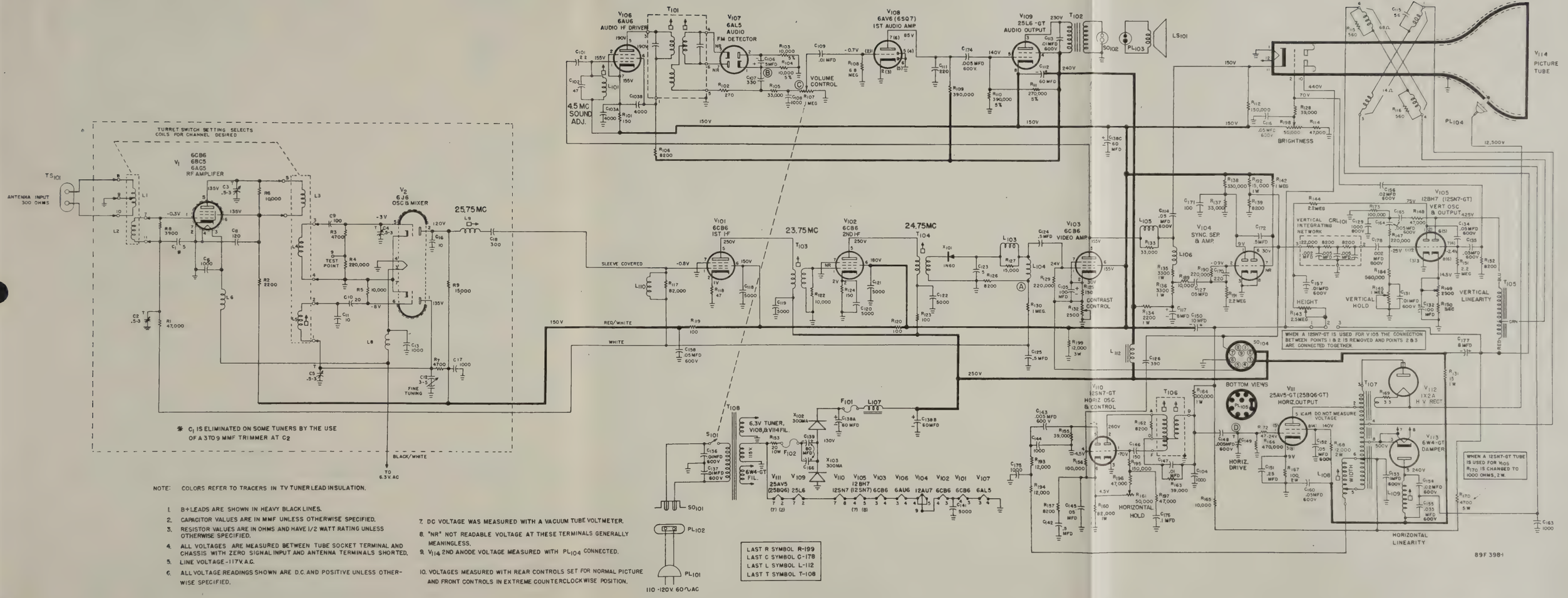
SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number
	RESISTORS (Cont.)	
R-164	100,000 ohms 1 watt, carbon	23X30X104K
R-166	470,000 ohms 1/2 watt, carbon	23X20X474M
R-167	100 ohms 2 watts, carbon	23X40X101K
R-168	12,000 ohms 2 watts, carbon	23X40X123K
R-169	3.3 ohms 1/2 watt, carbon	23X20X033K
R-170	4700 ohms 5 watts, WW or 1000 ohms 2 watts, carbon (See schematic notes)	24BF472E 23X40X102K
R-172	47 ohms 1/2 watt, carbon	23X20X470M
R-184	560,000 ohms 1/2 watt, carbon	23X20X564K
R-192	15,000 ohms 1 watt carbon	23X30X153K
R-193,194	12,000 ohms 1/2 watt, carbon	23X20X123K
R-198	50,000 ohms; BRIGHTNESS control	25A901
R-199	12,000 ohms 3 watts, WW	24A931
	TUBES AND RECTIFIERS	
V-1	6AG5, 6BC5 or 6CB6; r-f amplifier (part of TV tuner)	---
V-2	6J6: oscillator/mixer (part of TV tuner)	---
V-101,102,103	6CB6: 1st, and 2nd, i-f amp. and video amp.	90X6CB6
V-104	12AU7: sync. separator and amplifier	90X12AU7
V-105	12BH7: vert. osc. and output or 12SN7GT: vert. osc. and output	90X12BH7 90X12SN7GT
V-106	6AU6: audio i-f amp.	90X6AU6
V-107	6AL5: FM detector	90X6AL5
V-108	6AV6: audio amplifier or 6SQ7: audio amplifier	90X6AV6 90X6SQ7
V-109	25L6GT: audio output	90X25L6GT
V-110	12SN7GT: hor. osc. and control	90X12SN7GT
V-111	25AV5GT: horizontal output or 25BQ6GT: horizontal output	90X25AV5GT 90X25BQ6GT
V-112	1X2A: high voltage rectifier	90X1X2A
V-113	6W4GT: damper	90X6W4GT
V-114	16RP4: picture tube	90X16RP4
X-101	1N60 crystal diode	19B1246
X-102,103	Selenium rectifier, 300 ma.	27A155
	MISCELLANEOUS PARTS	
	Bearing, fiber; tuner shaft	8B1141
	Bracket, deflection yoke and focus assembly mtg. (bottom)	67D1235
	Bracket, deflection yoke and focus assembly mtg. (upper)	67D1348
	Bracket, deflection yoke mtg. (mounted on 67D1348)	67C1244
	Bracket, focus assembly support (mounted on 67D1348)	67C1386
	Bracket, focus device mounting (mounted on 67C1386)	63C503 or 63C489
	Bracket, pivot support (mounted on 67C1386)	67C1359
	Bracket, pivot; for centering control lever	67A1360 or 67B1351

Schematic Symbol	Description	Hallicrafters Part Number
	MISCELLANEOUS PARTS (Cont.)	
	Bracket, mounting for TS-101 and SO-101	67C1447
	Bracket, picture tube mtg.; front right	67C1313
	Bracket, picture tube mtg.; front left	67C1312
	Collar, picture tube mtg. (mounted in front of deflection yoke)	16C202
	Cushion, picture tube mtg.; sponge rubber	16A163
	Focus device assembly; PM	21C123 or 21C118
F-101	Fuse, 1/4 amp. 125 V.; slow blow	39A353
F-102	Fuse, 1.5 amp. 250 V.; pigtail leads	39A354
	Fuse holder for F-101	6A053
	Ion trap; 39 to 49 gauss	21A120
	Lever, centering control	74B337
PL-104	Plug, picture tube anode	10A377
PL-105	Plug, 9 pin; color adapter	10A299
SO-101	Socket, a-c power	10A286
SO-104	Socket, 9 pin; color adapter	6A370
	Socket, miniature 9 pin; molded mica filled	6A360
	Socket, miniature 9 pin; wafer	6A334
	Socket, miniature 7 pin; wafer	6A340
	Socket, 9 pin; wafer with corona ring	6A361
	Socket, octal; molded	6B296
	Socket, picture tube	6A386
SO-102	Socket, speaker	10A373
	Spring, picture tube ground	75B177
	Strap, picture tube mounting	76A628
S-101	Switch, OFF-ON (part of R-107)	
TS-101	Terminal strip, antenna	88A020 or 88A679
	Tuning unit assembly; complete with tubes	1D1049
CRL-101	Vertical integrating network	49B015
	CABINET PARTS	
	Antenna, Silver Vortex built-in	57D147
	Cabinet	78F667
	Cabinet back	8A1607
	Escutcheon assembly, front controls	7B274
	Escutcheon mask, picture tube	7D217
	Escutcheon, picture tube	7D196
	Glass, safety	22D292
	Knob, OFF/ON - VOLUME	15C297
	Knob, FINE TUNING	15A299
	Knob, CONTRAST	15D265
	Knob, CHANNEL SELECTOR	15D293
PL-101	Line cord and plugs	87A1668
PL-102	Plug, safety interlock connector (part of PL-101)	---
PL-103	Plug, speaker	10A372
LS-101	Speaker, 5 inch PM	85C103

* USE EXACT REPLACEMENT PARTS ONLY.

VALUES AND TOLERANCES SHOWN ARE NOMINAL AND VARIATIONS MAY BE FOUND. IT IS RECOMMENDED THAT THE VALUE OF ANY REPLACEMENT CORRESPOND TO THE NOMINAL VALUE OF THE PART BEING REPLACED.

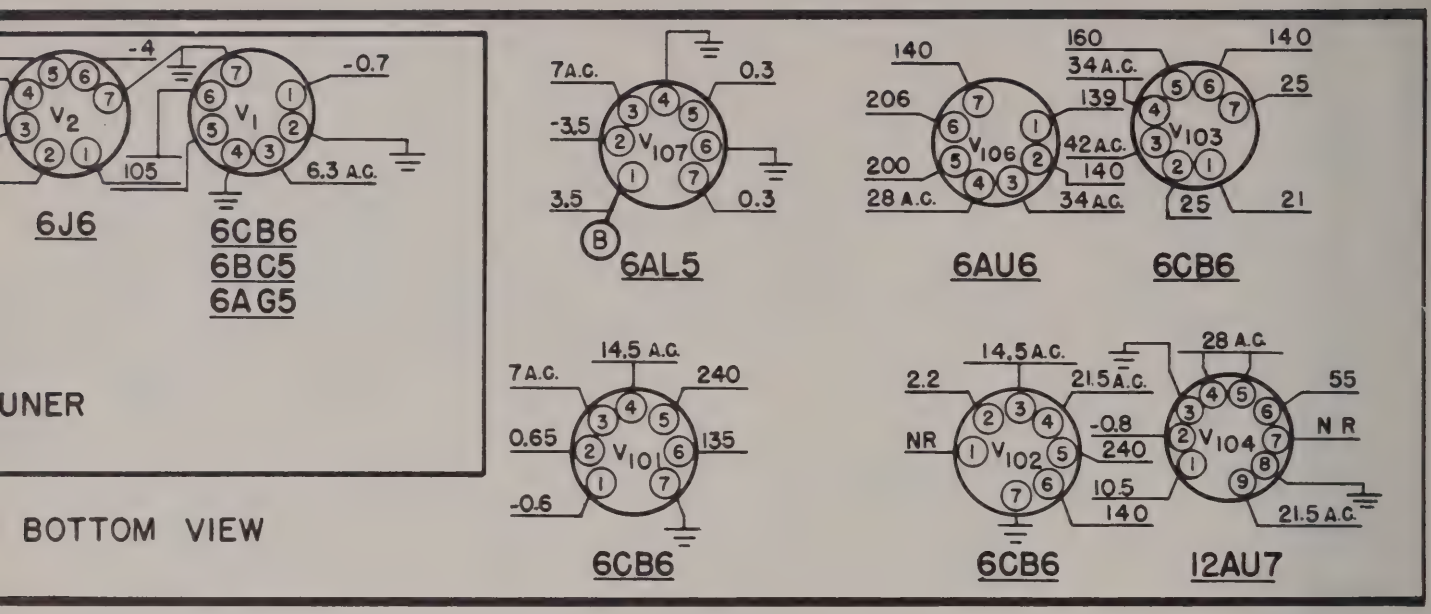


NOTE: COLORS REFER TO TRACERS IN TV TUNER LEAD INSULATION.

1. B+ LEADS ARE SHOWN IN HEAVY BLACK LINES.
2. CAPACITOR VALUES ARE IN MMF UNLESS OTHERWISE SPECIFIED.
3. RESISTOR VALUES ARE IN OHMS AND HAVE 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED.
4. ALL VOLTAGES ARE MEASURED BETWEEN TUBE SOCKET TERMINAL AND CHASSIS WITH ZERO SIGNAL INPUT AND ANTENNA TERMINALS SHORTED.
5. LINE VOLTAGE - 117 V. A.C.
6. ALL VOLTAGE READINGS SHOWN ARE D.C. AND POSITIVE UNLESS OTHERWISE SPECIFIED.
7. DC VOLTAGE WAS MEASURED WITH A VACUUM TUBE VOLTMETER.
8. "NR" NOT READABLE VOLTAGE AT THESE TERMINALS GENERALLY MEANINGLESS.
9. V_{114} 2ND ANODE VOLTAGE MEASURED WITH PL_{104} CONNECTED.
10. VOLTAGES MEASURED WITH REAR CONTROLS SET FOR NORMAL PICTURE AND FRONT CONTROLS IN EXTREME COUNTERCLOCKWISE POSITION.

LAST R SYMBOL R-199
LAST C SYMBOL C-178
LAST L SYMBOL L-112
LAST T SYMBOL T-108

MODEL 17905
SCHEMATIC DIAGRAM
RUN 1



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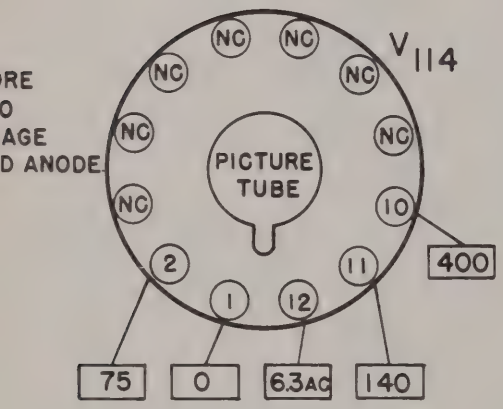

Fig. 20. Voltage Chart for Tuner-IF Assembly and Picture Tube

L VOLTAGES ARE MEASURED BETWEEN THE TUBE SOCKET TERMINAL AND THE CHASSIS WITH ZERO GNAL INPUT AND THE ANTENNA TERMINALS SHORTED.

NE VOLTAGE SET AT 117 VOLTS.

L VOLTAGE READINGS SHOWN ARE D.C. AND POSITIVE UNLESS OTHERWISE SPECIFIED.

L D. C. VOLTAGES ARE MEASURED WITH A VACUUM TUBE VOLTMETER (VTVM).

R" INDICATES THAT THE VOLTAGE IS NOT READABLE. VOLTAGE AT THESE TERMINALS IS USUALLY EANINGLESS.

LTAGES ARE MEASURED WITH REAR CONTROLS SET FOR NORMAL PICTURE OPERATION AND FRONT NTROLS IN THE EXTREME COUNTERCLOCKWISE POSITION.

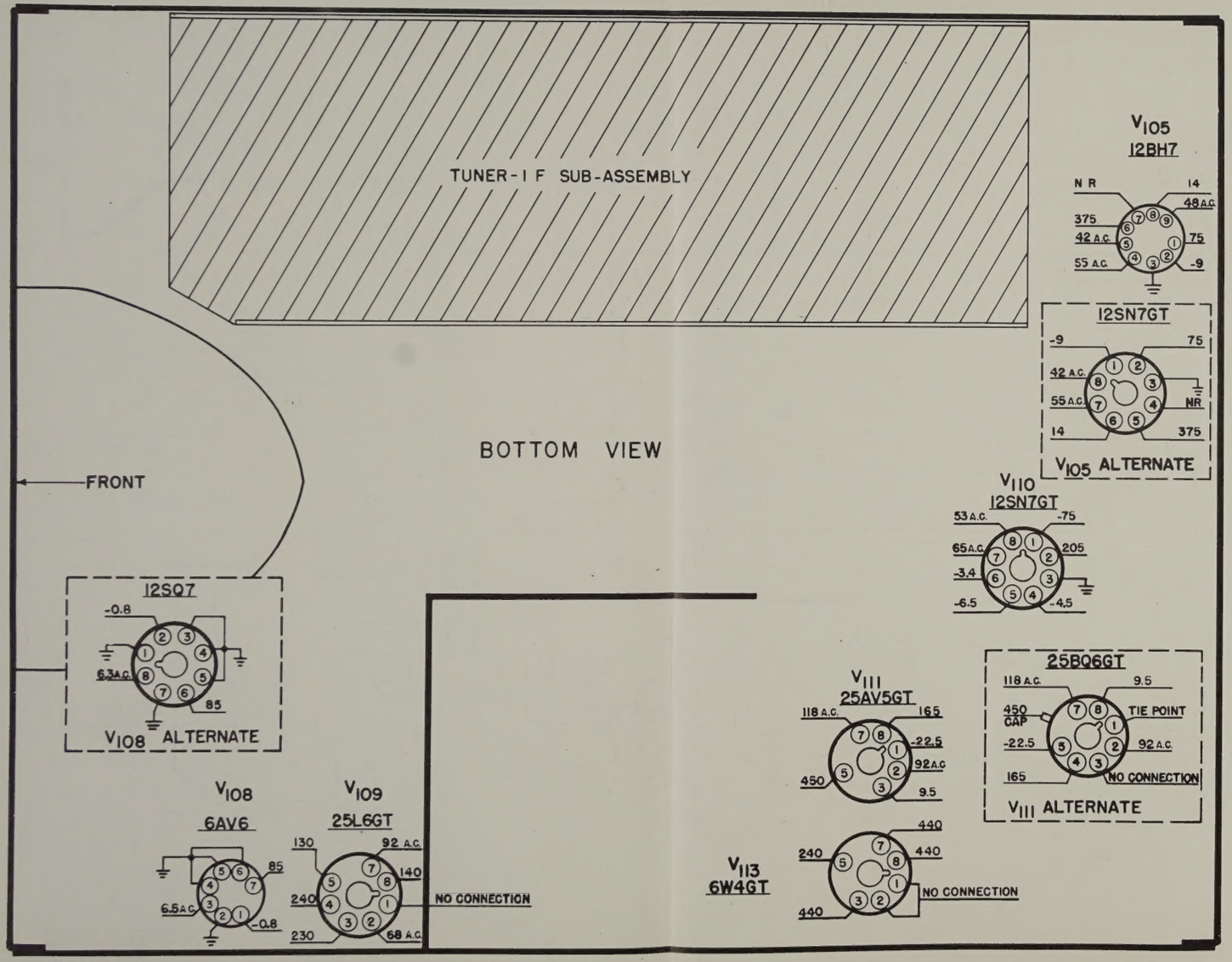

Fig. 19. Voltage Chart for Main Chassis

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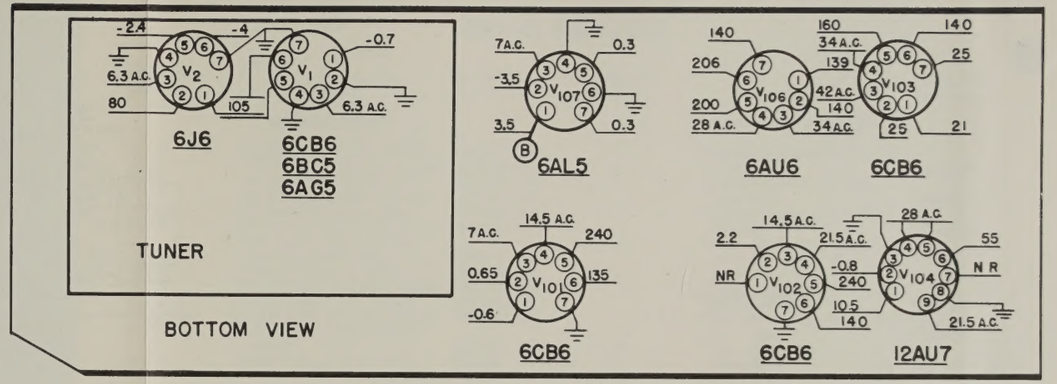

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CAUTION —
SEE TEXT BEFORE ATTEMPTING TO MEASURE VOLTAGE ON THE SECOND ANODE

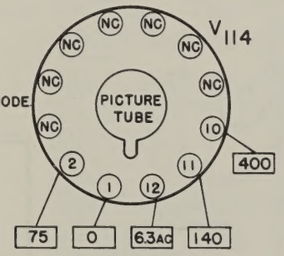

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Fig. 20. Voltage Chart for Tuner-IF Assembly and Picture Tube

1. ALL VOLTAGES ARE MEASURED BETWEEN THE TUBE SOCKET TERMINAL AND THE CHASSIS WITH ZERO SIGNAL INPUT AND THE ANTENNA TERMINALS SHORTED.
2. LINE VOLTAGE SET AT 117 VOLTS.
3. ALL VOLTAGE READINGS SHOWN ARE D.C. AND POSITIVE UNLESS OTHERWISE SPECIFIED.
4. ALL D. C. VOLTAGES ARE MEASURED WITH A VACUUM TUBE VOLTMETER (VTVM).
5. "NR" INDICATES THAT THE VOLTAGE IS NOT READABLE. VOLTAGE AT THESE TERMINALS IS USUALLY MEANINGLESS.
6. VOLTAGES ARE MEASURED WITH REAR CONTROLS SET FOR NORMAL PICTURE OPERATION AND FRONT CONTROLS IN THE EXTREME COUNTERCLOCKWISE POSITION.